N.S.W. DEPARTMENT OF AGRICULTURE.

BIOLOGICAL BRANCH - DIVISION OF SCIENCE SERVICES.

IMPERIAL MYCOLOGICAL
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INSTITUTE

PLANT DISEASE SURVEY

for the

TWELVE MONTH PERIOD ENDING 30TH JUNE, 1941.

Eleventh Annual Report.

Notes compiled by Officers of the Plant Pathological Section of the Biological Branch, New South Wales Department of Agriculture.

ACKNOWLEDGMENTS. Grateful acknowledgment is made of data provided by the Colonial Sugar Refining Company Ltd. in respect of diseases of sugar cane; also information made available by the Specialist and Field Officers of the Divisions of Horticulture and Plant Industry in the Department of Agriculture.

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N.S.W. DEPARTMENT OF AGRICULTURE.

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BIOLOGICAL BRANCH.

PLANT DISEASE SURVEY, 1940-41.

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CEREALS and GRASSES.

WHEAT.

Extremely dry weather prevailed throughout all wheat growing areas and many crops failed altogether. The total production of wheat in New South Wales last season only amounted to 24½ million bushels compared with a normal average production of 55 million bushels.

Owing to the dry conditions disease development was very slight, and only traces of infection with the various diseases were reported. STEM RUST (Puccinia graminis) was almost entirely absent, and even in the North West it was impossible to obtain satisfactory infection ratings on plant breeding material being tested for rust resistance.

Traces of LOOSE SMUT (Ustilago tritici) were present in nearly all crops. Infection with FLAG SMUT (Urocystis tritici), FOOT ROT (Helminthosporium spp.) and TAKE-ALL (Ophiobolus graminis) was also very light.

Some FROST INJURY was observed but generally the damage from this cause was less than usual.

OATS.

In common with wheat the oat crops were also affected adversely by the dry season, and apart from smut very little disease was observed. LOOSE SMUT (Ustilago avenae) was fairly prevalent in many crops and Fulghum oats again showed definite susceptibility to the disease. In one crop at Dubbo of 100 acres of Fulghum which had been grazed with sheep, 40-50% infection with loose smut was reported. The seed had not been treated prior to sowing. Preliminary tests showed that infection in this variety is reduced by seed treatment with Ceresan.

BARLEY.

No information is available concerning the disease situation in commercial crops. In the barley smut fungicide experiments at Wagga Experiment Farm both LOOSE SMUT (Ustilago nuda) and COVERED SMUT (Ustilago hordei) occurred in about equal amounts, the total smut infection being 10-15%. Chemical seed treatment is ineffective for loose smut control and at Wagga last season it also failed to control covered smut, as there were no discernible differences between treated and control plots.

RYE.

No special occurrences of disease were reported on this crop. It is worth recording, however, that in response to the British Government's appeal for supplies of ERGOT (Claviceps purpurea) during the war, about 30 growers throughout the State entered into the project of production of rye ergot by artificial means. In all, 200 acres of rye were inoculated at flowering time, cultures being supplied gratis to growers by the Biological

Branch/

Branch. Dry seasonal conditions generally were adverse to ergot formation, yields ranging from ½ lb. to 20 lb. per acre. In an experimental plot at the Botanic Gardens, however, the yield was at the rate of 122 lbs. to the acre. Assay of ergots from various localities in the State showed the alkaloid content to be highly satisfactory. Though it was apparent that ergots of high quality could be produced artificially in this State, the chief limiting factor to success on a commercial scale is the uncertainty of weather conditions at the time rye comes into flower. Only in cooler, moister areas is success likely to be achieved.

RICE.

No information.

MAIZE.

Prolonged dry weather during the late winter and spring months interfered materially with the germination of early sown crops. After the November rains, however, conditions were very favourable, and throughout the summer growing period seasonal conditions were excellent in all areas except the far south coast, where continued dry weather was experienced, particularly in the Bega district. Some crops on the Northern Tablelands failed to ripen satisfactorily owing to prolonged cool wet weather and lack of adequate sunshine. Preliminary crop estimates indicated a total maize yield of over 4 million bushels, which is considerably greater than the annual production for many years.

ROOT AND BASAL STALK ROT (Gibberella zeae) was particularly prevalent in coastal districts and cases of severe infection were reported from the Macleay and Clarence River Areas. In the Maitland and Singleton districts many affected plants showed a considerable development of Macrophomina phaseoli in the rotted basal tissues. This is the first season this fungus has been prevalent on maize in New South Wales, although it has been recorded previously on maize in U.S.A. and elsewhere. Inoculation experiments conducted at the Botanic Gardens late in the season failed to give definite evidence of pathogenicity. Very severe lodging and stalk collapse occurred in hybrid trials at Branxton, and although both Gibberella zeae and Macrophomina phaseoli were prevalent the available data indicated that the primary cause of the condition was inherent stalk weakness, as the land had not grown maize previously and, moreover, the open pollinated variety Fitzroy was not affected to the same extent as were the hybrids.

The destruction of old maize stalks by burning is now being adopted fairly widely and growers admit its value in reducing infection. On the South Coast, the variety Funks Yellow Dent is being superseded by other varieties which stand better and are not so susceptible to root and basal stalk rot.

EAR ROTS (Gibberella spp., Diplodia zeae) occurred in all districts, and were more severe in North Coast areas than for several seasons. They were less prevalent than usual on the Northern Tablelands owing to the much lower incidence of the corn ear worm with which the Fusarium type of ear rot is usually associated.

LEAF BLIGHT (Helminthosporium turcicum) was unusually prevalent in all districts and was particularly severe on the Northern Tablelands where substantial reductions in yield and pinching of grain were anticipated. The disease was reported to be most severe at Glen Innes, whilst in the Tenterfield district where white grained varieties are mostly grown it was not so serious.

Rust/

RUST (Puccinia sorghi) was more prevalent than usual and occurred in all areas. Inbred lines of maize at New England Experiment Farm showed marked differences in reaction to rust infection, and several lines were practically killed out as a result of severe infection. Most lines were only slightly rusted.

HEAD SMUT (Sorosporium reilianum) was present in some crops but was not important.

AMERICAN MAIZE SMUT (Ustilago zeae) was not recorded this season. A further extensive survey was made of crops in the Bathurst district but no infection was found despite the fact that the area sown with maize in this locality was considerably greater than in any year since the disease was recorded in field crops.

BARREN STALKS and NUBBIN EARS were again prevalent in all areas and in many crops up to 20% of the stalks failed to produce commercial grain. These conditions are generally considered to be expressions of undesirable genetic factors, and it is worthy of note that in hybrid maize unproductive plants of this type have often been eliminated completely.

SORGHUM.

KERNEL SMUT (Sphacelotheca sorghi) was more prevalent than usual in sweet sorghum crops and was very noticeable in the seed producing areas at Moruya. The disease was also prevalent in this area in the previous season when 15-20% infection was recorded in an 8-acre crop. The disease was also prevalent in grain sorghum crops in the Inverell district, where 10-12% infection was recorded in 10 acres of Wheatland Milo. This seed had been introduced from the grain sorghum areas of Queensland. Kernel smut is readily controlled by seed treatment and publicity along these lines will be undertaken prior to next seeding.

HEAD SMUT (Sorosporium reilianum) was present in some crops of sweet sorghum on the lower Hunter River, but the infection was limited to 1% or less.

RED STAIN and SHEATH ROT due to aphid injury + Fusarium moniliforme was again of common occurrence in coastal areas but caused no appreciable damage.

LEAF BLIGHT (Helminthosporium turcicum) was severe on many late crops and caused considerable leaf injury which often completely killed the lower leaves before harvest.

BROOM MILLET.

KERNEL SMUT (Sphacelotheca sorghi) was more prevalent than usual, as was the case with this fungus on sorghum.

ROOT and STALK ROT (Colletotrichum sp.) was again prevalent on the Lower Hunter River and particularly where two successive crops had been grown on the same land.

BACTERIAL STRIPE (B. andropogoni) was very severe in two acres of a late crop at Morpeth, and had killed most of the lower leaves.

LEAF BLIGHT (Helminthosporium turcicum) was of common occurrence and caused a good deal of leaf necrosis.

RED STAIN (Aphid injury + Fusarium moniliforme) was again common but of little importance. This type of stain discolours the hurl but is readily bleached out during treatment of the fibres prior to processing. Nevertheless millet buyers will discriminate against badly stained fibre, even though the stain

does not/

does not affect it for manufacturing purposes. At Tumut the condition occurred in a rather unusual way, being more or less restricted to the brush end of the hurl.

GRASSES.

ERGOT (Claviceps paspali) was again widespread on paspalum in all Coastal districts. Stock mortality due to ergot poisoning was reported from Tamworth.

BROWN PATCH (Curvularia spicata and Rhizoctonia solani) was again common on bowling and golf greens. Effective control of this condition has been hampered by the high cost of mercury compounds resulting from the war. Several Sydney greenkeepers reported that treatment with copper sulphate and potassium permanganate as used in Western Australia, failed to control the disease in the metropolitan area. Proprietary organic mercury compounds are being used more extensively than before the war.

LEAF SPOT (Piricularia grisea) was recorded on Buffalo grass (Stenotaphrum secundatum) at Narrabeen during a period of wet weather in the summer. It was also recorded on summer grass (Digitaria sanguinale) in the Gosford district during the same period.

BLIGHT (Helminthosporium sp.) attacked both the inflorescence and leaves of crab grass (Eleusine indica) at Gosford.

SUGAR CANE.

Figures supplied by the Colonial Sugar Refining Co. show that for the 1940 crushing season in N.S.W., the total quantity of cane crushed was 342,548 tons. The estimated quantity of cane lost through diseases was:-

Fiji Disease:	2,320 tons.
Mosaic:	120 "
Total	2,440 "

GUMMING DISEASE (Bacterium vascularum). This disease has become almost extinct on the Clarence River, but since Badila - a susceptible variety - is still being grown in some sections, the Local and District Quarantines are still in force to prevent the uncontrolled movement of cane plants, possibly diseased, from one district to another; the regulations prohibit the introduction of any varieties from outside the County of Clarence into the Clarence area. Likewise, the introduction of cane plants into the Land District of Lismore from any outside source is still prohibited by quarantine regulations. Again, the introduction is prohibited of cuttings from any outside source into the Land District of Murwillumbah, which embraces the cane-growing areas of the Tweed.

Gumming remained well under control in the Murwillumbah district last season. New outbreaks, however, of a minor nature were found on several Condong Plain and river bank farms, but there was no spread therefrom. Infection was still present at Cudgen in two small Badila fields. These occurrences indicate that the growing of any susceptible variety would be unsafe. Some resistant varieties are 25 SN 8, Jason and Atlas.

LEAF SCALD (Bacterium albilineans). With the elimination of Mahona as a commercial cane this disease has ceased to cause crop losses on the Richmond River. The extent of the trouble on the Tweed River cane areas is very slight.

Fiji Disease/

FIJI DISEASE (virus). Owing to the extensive cultivation of the highly susceptible varieties P.O.J. 2878 and P.O.J. 2883, this disease has become the most serious cane disease in the State. Spread occurs by planting infected cane, and by the sugar cane leafhopper which may carry infection over considerable distances. The control measures include the growing of resistant varieties, selection of disease-free cane for planting, roguing of diseased stools in young crops, and the ploughing out of badly diseased crops after cutting - instead of ratooning them. The disease makes most active development in January to June, and roguing in this period is very important.

Spread of the disease is particularly noticeable in rank-growing crops on rich or well fertilised land, conditions which favour rapid multiplication of the leaf hoppers. Wet weather also greatly assists dissemination of the trouble. One of the most serious obstacles to control is the fact that once a stool becomes infected, it remains perfectly healthy in appearance for 5-70 weeks or even longer, thus making impossible their detection at the time of selecting material for planting. Hence the advice to growers is to avoid cane plants in vigorously growing crops as they are liable to contain much dormant infection. Control by careful roguing has proved effective in crops showing less than 30 diseased stools per acre on all except the richest lands; but with more disease than this, roguing frequently fails to keep pace with the spreading.

The following varieties are resistant to FIJI DISEASE: Q813, Korpi, Oramboo, Nanemo, Atlas, Jason, 25 SN8, and these are recommended where the favoured but susceptible variety P.O.J. 2878, is not approved.

MOSAIC (virus). This disease is spread by the corn aphis, so that wherever maize is grown the means of dissemination will always be present. It is in cane crops grown near corn or sorghum that the greatest amount of infection occurs. Most of the approved varieties, excepting P.O.J. 2878, P.O.J. 2883, Q.813, Atlas and Jason, are more or less susceptible to Mosaic; and Korpi, in particular, is liable to suffer severe damage therefrom.

In the Murwillumbah district, a gradually increasing degree of infection was noted after 1937, due mainly to the extension of the susceptible variety Comus, but, in 1940, Mosaic made considerable advance in that cane, some fields being seriously affected. Increased infection, though slight, has occurred in the moderately resistant 25 SN8 and in the resistant Q813.

DISEASE CONTROL MEASURES: The principal measures advocated by the C.S.R. Co. for the control of cane diseases are as follow:-

1. The discarding of susceptible varieties and the planting of resistant ones.

2. The selection of disease-free cane only for planting.

3. The eradication of diseased cane.

4. Avoidance of the transfer of cane cuttings from one part of a district to another, except under special supervision. (Cf. Govt. Quarantine Regulations cited under Gumming Disease above).

5. Avoidance of planting those fodder canes which are susceptible to the major diseases of sugar cane and may thus become a menace to commercial crops.

6. Where crops are ploughed-out, it is important to ensure that no stools are still alive when the field is replanted with cane, since such volunteer stools will, if diseased, act as a medium for transferring diseases to the new crops.

7. Good cultivation generally, including adequate drainage, trash conservation, sub-soiling, green manuring and thorough preparation of the soil before planting.

FIELD AND FORAGE CROPS.

LUCERNE.

WITCHES BROOM (virus) continues to be the most important disease of lucerne in the lower rainfall areas where the crop is grown mainly for grazing purposes.

RUST (Uromyces medicaginis) and LEAF SPOT (Pseudopeziza medicaginis) were prevalent during the summer months when rainfall was abundant, but caused little damage.

DOWNY MILDEW (Peronospora trifoliorum) was also fairly common during the summer and autumn and caused minor losses in localised areas.

CLOVERS, &c.

MOSAIC (virus) was common in red clover (Trifolium pratense) at Leeton Experiment Farm, and was also recorded on Melilotus gracilis, Trifolium hybridum and Scorpiurus sp.

WITCHES BROOM (? virus) occurred on Psoralea bituminosa at Leeton Experiment Farm. The symptoms were identical with those of witches broom in lucerne.

STEM BLIGHT (Phoma sp.) was recorded on Melilotus elegans at Leeton Experiment Farm.

SOYBEANS.

WILT and STALK ROT (Sclerotinia libertiana) was fairly prevalent in crops on the Murrumbidgee Irrigation Area. Infected plants were usually killed.

BACTERIAL BLIGHT (Bacterium glycineum) was common at New England Experiment Farm and caused widespread leaf spotting.

COWPEAS.

ROOT KNOT (Heterodera marioni) was sewere on Black cowpeas at Hawkesbury Agricultural College. Poona and four other varieties were much less susceptible.

PEANUTS.

LEAF SPOT (Cercospora personata) was prevalent at Grafton Experiment Farm.

STEM BLIGHT (Botrytis sp.) caused severe injury to plants grown at Baulkham Hills.

LINSEED and FLAX.

RUST (Melampsora lini) was severe in 84 acres of Punjab linseed grown under irrigation at Bourke. The seed from which this crop was derived was imported from the Imperial Valley of California, U.S.A., and according to the Agronomist in charge of Flax investigations in U.S. Department of Agriculture, rust has never been recorded in this region. Moreover, a careful examination of (1) plant fragments taken from the seed sample and (2) debris obtained from the sample by centrifuging, failed to show the presence of rust spores.

No flax or linseed had ever been grown previously in any part of the Bourke district and the closest existing crops were at

Leeton/

Leeton some 300 miles distant. The origin of the inoculum is therefore a matter of considerable interest. A careful search in the vicinity of the affected crop failed to show the presence of any native species of Linum on which the rust may have originated. However, some weeks later a specimen of "native flax" identified by Mr. R.H. Anderson as Linum marginale was received from Mocoolta Station, about 15 miles distant from the affected linseed crop. Examination showed that the L. marginale was infected with Melampsora lini. Infection studies carried out at the University by Dr. W.L. Waterhouse have shown that the rust on L. marginale was capable of infecting Punjab linseed.

It is still not known, however, whether this "native flax" was the source of inoculum for the Punjab linseed, or whether both these hosts became infected from wind-borne inoculum from Leeton or elsewhere.

Rust was also severe on Punjab linseed at Leeton Experiment Farm, and it also occurred on the variety Abyssinian, although infection on this variety was not as severe as in the case of Punjab. In other varieties of both linseed and flax very little, if any, rust developed. At the New England Experiment Farm no rust occurred in any of the flax or linseed varieties either in the plant breeding or field experiment areas.

BROWNING (Polyspora lini) was prevalent on flax and linseed at the New England Experiment Farm during the autumn. This was the first record of this disease in Australia and appropriate quarantine measures were adopted. In the plant breeding material there were considerable differences in reaction to the disease and a number of resistant or highly tolerant lines were selected for future breeding work. Biological examination of seed samples of five varieties of linseed grown in the field experiment area at Glen Innes last season, showed that in each case the seed was infected with Polyspora lini, the incidence ranging from 1 to 14% infection. The disease was subsequently found to be present on flax straw in the Junior Farmers' Exhibit at the Royal Empire Show. This material had been grown either at Wagga or Lithgow and the organiser of the exhibit gave an undertaking that it would be burned. Further work is in progress on certain mycological aspects of this disease.

WILT (undetermined) occurred in linseed at both Leeton and Glen Innes. In some of the varietal trials at the latter farm 10-15% of plants either showed symptoms of wilt or were dead when inspected at flowering. Several types of Fusaria and Macrophomina phaseoli were isolated from wilted material, but subsequent infection studies in the greenhouse failed to demonstrate pathogenicity. These experiments involved 11 local isolates of Fusarium, 1 of Macrophomina phaseoli and 2 isolates of Fusarium lini of American origin obtained from Dr. Waterhouse. The only positive infection results were obtained with one isolate of Fusarium lini, which was particularly virulent and caused severe wilting and ultimate death of practically all seedlings. Further investigational work is in progress and additional inoculation experiments are to be carried out.

STEM-BREAK (undetermined) was recorded in linseed variety trials at Glen Innes. The main stem fractures horizontally a few inches above soil level and then collapses but usually remains alive. The fracture occurs without any previous lesioning of the stems. Secondary shoots are then produced below the fracture line and these appear to develop normally. Isolations made from collapsed stems in nearly all cases failed to yield any organism. In no case was Polyspora lini associated with this condition. This is of considerable interest because a similar type of injury has been ascribed to this fungus elsewhere.

Sunflower/

SUNFLOWER.

STALK AND HEAD ROT (Sclerotinia sclerotiorum) was a very serious disease during the past season. The disease attacks all aboveground parts of the plant, one of the commonest types of injury being severe lesioning of the stalks 2-3 feet above the ground. The stalks invariably collapse at the point of lesioning and the tissues become badly rotted and shredded. The fungus also causes severe rotting of the heads, and this phase of the disease may develop independently of stalk rot infection. The leaves may also be badly rotted but this type of infection generally seems to be caused by mycelial spread along the petiole from affected stalks. The rotted areas show abundant mycelial growth and sclerotia are developed profusely in the rotted stalk and head tissues. At Grafton Experiment Farm an early sown crop of 1 acre (sown September-October) was practically wiped out with this disease. A later sown crop of the same area (sown December) showed about 15% severe stalk rot and 5-7% head rot when inspected in the latter part of May. Weather conditions had been much drier during the growth of the later crop and would account for the lower incidence of infection.

In a commercial crop of 5 acres at Edgeroi sown in February, 20% of the plants had been killed by mid-June. Infection in this case had mostly killed the plants prior to heading. The disease was also recorded from Delungra but no information is available concerning the extent of the damage.

RUST (Puccinia helianthi) was present at Grafton but caused little damage.

SESAME. (Sesamum indicum).

LEAF SPOT (Cercospora sesami) was recorded from Grafton Experiment Farm. The lesions were small and no serious injury was caused.

LEAF SPOT and STEM BLIGHT (Macrosporium sp.) was very severe at Grafton Experiment Farm and caused complete defoliation and premature death of plants.

SUNN HEMP (Crotolaria juncea).

ROOT and STALK ROT (Fusarium sp.) and STALK ROT (Sclerotinia sclerotiorum) were recorded at Grafton Experiment Farm.

INDIAN HEMP (Cannabus sativa).

STALK ROT (Sclerotinia sclerotiorum) affected occasional plants and caused rotting of a few upper branches at Grafton Experiment Farm.

JUTE (Corchoris capsularis).

STALK ROT (Sclerotinia sclerotiorum) occurred on a single plant amongst those grown at Grafton Experiment Farm.

INDIGO (Indigophera sp.)

MARGINAL LEAF NECROSIS (undetermined) occurred at Grafton Experiment Farm, where nearly all plants were affected. Phoma sp., Macrosporium sp. and bacteria were associated with the necrosis, but the nature of the injury suggested a scalding effect due to non-parasitic causes.

Tobacco/

TOBACCO.

BIG-BUD (virus) - isolated plants only, seen in crops at Dungowan.

BLUE MOULD (Peronospora tabacina): The season was one favourable to this disease, and several crops in the Dungowan area suffered heavily from field "mould." The adoption of the seed-bed benzol treatment is now general in this State and seed-bed losses are now insignificant.

YELLOW DWARF (virus) was again a widespread disease in the Tamworth district; Crops at Dungowan averaging 50% infected plants in January. The season was one of ample and well spaced rainfall and "recoveries" of plants were so frequent that it is doubtful if the final harvest was much affected.

MOSAIC (virus) was widespread in all crops in the Tamworth district, 100% incidence being recorded in one advanced crop at Moore Creek in January.

SPOTTED WILT (virus) was present but not widespread at Dungowan. Not observed in survey at Moore Creek.

VEGETABLE CROPS.

BEAN.

ALTERNARIA SPOT (Alternaria fasciculata) and ANGULAR LEAF SPOT (Isariopsis griseola) were present in most crops, particularly on the older leaves of mature plants, the incidence of these diseases being much the same as in preceding years.

ASHY STEM BLIGHT (Macrophomina phaseoli) was recorded from Dubbo where, in a planting of six acres, 5% of the plants were either killed early or showed wilting and yellowing at the time of pod formation. There were no other records of the disease.

BACTERIAL DISEASES: HALO BLIGHT (Bacterium medicaginis var. phascolicola) was again the most important bean disease. Spring crops in the Gosford district suffered more than in the preceding year. Investigation of complaints by Gosford growers concerning certain lines of Departmentally-recommended seed used for the spring crops showed that excessively wet weather in August had resulted in the rapid development and spread of the disease even in those lines carrying only a trace of disease. No reports are available concerning the position on the Far North Coast during the past year. Mid-season crops showed somewhat more than the usual amount of halo blight. Because of wet conditions in mid-summer several seed crops submitted for recommendation developed more diseased plants than could be satisfactorily removed by roguing. On the other hand, there were a number of seed crops in which no diseased plants were recorded at any of the Departmental inspections. The total amount of seed recommended was less than in the previous year. Observations again indicated that Hawkesbury Wonder has greater resistance to halo blight than Canadian Wonder and Tweed Wonder. However, it appears that disease-free seed of Tweed Wonder or Wellington Wonder - a recent selection from Tweed Wonder - meets the requirements of the Gosford-Wyong growers for the spring crop, when halo blight is of most importance, better than seed of Hawkesbury Wonder or any other variety showing resistance to the disease.

BACTERIAL SPOT (Bacterium syringae) was recorded from the Gosford-Wyong district in one crop. The disease caused by Bacterium phaseoli was recorded from several localities, there

being/

being more records of this disease than in any previous year but there were no reports of serious losses.

FUSARIUM ROOT ROT (Fusarium solani var. martii) was much less in evidence than in the preceding year due mainly to the limited planting of the Stayley's Surprise variety, following heavy losses in the previous year when this variety was widely used.

MOSAIC (virus) was present in most crops but in few cases was the infection severe. One case of severe infection (25%) was observed in the Wyong district.

RUST (Uromyces appendiculatus) was present on practically all plantings of the Epicure variety in the Sydney Metropolitan Area, being responsible for much defoliation and reduction in yield. Although none of the very susceptible climbing types is grown to any extent on a commercial scale there is an obvious need for a resistant climbing variety to replace Epicure for home gardeners. Kentucky Wonder and Glory of Summer are also very susceptible. There were two records of light infection of commercial plantings of Brown Beauty (dwarf).

SCALD (?) was again recorded in a few crops in the Gosford-Wyong district when locally saved seed was planted. Experiments on the use of boron, zinc, manganese and copper salts were inconclusive owing to the failure of scald to develop in any of the experimental plots. Field experiments carried out by the Division of Plant Industry on the use of lime and dolomite were inconclusive for the same reason. Analyses made by the Chemist's Branch showed the presence of excessive amounts of manganese in scald-affected plants, probably connected with acid soils.

SCLEROTINIA ROT (Sclerotinia sclerotiorum) was present in both spring and autumn crops in the Gosford-Wyong district. Infection in spring crops was, as usual, light. In autumn crops infection was on a more extensive scale than in the previous autumn but was not as severe as two years earlier. Severe losses were reported in the autumn from Prospect and Dundas, particularly at Prospect on a property which had been intensively cropped with lettuce in the past few years.

SCLEROTIUM ROT (Corticium rolfsii) was recorded from several localities on the coast during the warmer months of the year, the incidence of the disease being much the same as in previous years.

WITCHES BROOM (? virus): Five plants showing a witches broom condition were found in one acre of beans at Dubbo. The same condition which, so far, has only been recorded west of the Blue Mountains, had been observed on the same farm in previous years.

BEET.

CERCOSPORA LEAF SPOT (Cercospora beticola)was again widespread but caused no serious losses.

DOWNY MILDEW (Peronospora schachtii) was widespread in beet crops in the metropolitan area and adjoining districts during the winter and spring months of 1940.

BEET SICKNESS (cause undetermined) was again prevalent throughout the market garden areas in the metropolitan area, particularly in the Matraville and Mascot sections. Preliminary experiments on the steam sterilisation of soil from where an affected crop was grown showed that the disease was apparently of a parasitic nature. Most common isolates obtained from diseased roots have been species of Fusarium.

Broad Bean/

BROAD BEAN.

The most common cause of complaint in broad beans was FAILURE TO SET PODS, all of the earliest formed flowers frequently dropping. Other records include CHOCOLATE SPOT (both the aphid injury and Botrytis types), MOSAIC (virus), CERCOSPORA SPOT (Cercospora fabae) and SPOTTED WILT (virus).

CARROT.

LEAF BLIGHT (Macrosporium carotae) was recorded from a commercial crop at Matraville (Metropolitan Area), where considerable leaf damage was in evidence.

SCLEROTINIA ROT (Sclerotinia sclerotiorum) was recorded, for the first time in New South Wales, on a seed crop at Dundas.

SCLEROTIUM ROT (Corticium rolfsii) was recorded, for the first time in New South Wales, at Emu Plains.

CELERY.

LATE BLIGHT (Septoria apii-graveolentis) was the only disease recorded, being present in practically all celery crops.

CRUCIFERS.

ALTERNARIA SPOTS. The disease caused by Alternaria brassicae was widespread on cauliflowers but, although some damage to curds and leaves was recorded in commercial plantings, it was mainly on seed crops that the disease was of importance. In the case of a seed crop at Dundas, where serious losses had occurred the previous season, systematic spraying with Bordeaux mixture was carried out. The incidence of disease in this sprayed crop was considerably less than it had been in the preceding year but it was not possible to state with certainty whether this difference was due to the spraying or to different seasonal conditions. A leaf spot condition caused by Alternaria herculea was recorded on turnip (Brassica rapa) for the first time in New South Wales, at Wyong.

BACTERIAL LEAF SPOT (Bacterium maculicolum) was recorded on cauliflowers from several localities but in no case was it responsible for any serious damage.

BLACK LEG (Phoma lingam) was more prevalent than usual on cabbages in the Robertson-Moss Vale area.

BLACK RING (virus): Several specimens of cauliflower with symptoms suggestive of the Californian black ring disease were received for examination. One attempt to transfer the disease to cabbages by mechanical inoculation with juice from diseased plants was unsuccessful.

BLACK ROT (Bacterium campestre) was very widespread in cauliflower crops during the autumn months of 1941. Cabbage crops were not affected to the same extent. In general, the disease was present to a greater extent in crops grown from imported seed than in crops grown from locally saved seed. A severe infection of cauliflower crops in the Bathurst district was apparently connected with the use of diseased seed, wet conditions in the seedbed and a heavy infestation with cabbage moth.

CLUB ROOT (Plasmodiophora brassicae) was of much the same incidence as in previous years.

DOWNY MILDEW (Peronospora parasitica) was responsible for

considerable/

considerable losses in cabbage seed beds during the autumn months of 1941. It was also present in most crops after transplanting but serious losses appeared to be confined to seed beds.

SCLEROTINIA ROT (Sclerotinia sclerotiorum) was recorded in two cauliflower seed crops in the Dundas-Parramatta section of the Metropolitan Area, substantial economic losses being sustained by the complete killing of the plants.

WHIPTAIL (non-parasitic) was of much the same incidence as in previous years. A condition closely resembling whiptail was observed in white turnip at Wyong.

CUCURBITS.

DOWNY MILDEW (Peronoplasmopara cubensis) was recorded, for the first time in New South Wales, on marrow. The incidence on cucumbers and rockmelons appeared to be much the same as in previous years.

FAILURE TO SET FRUITS: Numerous instances of failure of cucurbits, particularly pumpkins, marrows and squashes, to set fruits were reported. No definite conclusions concerning the cause of the trouble were reached. In all cases reported there appeared to be an adequate population of bees for the transfer of pollen from staminate to pistillate flowers. Wet weather at flowering time, curtailing the activity of pollinating insects during a critical period, was one of the causes attributed by officers of the Division of Plant Industry.

FUSARIUM WILT (Fusarium niveum) of watermelon: No reports of any serious losses.

LEAF BLIGHT (Macrosporium cucumerinum) was recorded, for the first time in New South Wales, on pumpkin and cucumber, although it had previously been recorded on rockmelon.

MOSAIC (virus) symptoms were recorded on choko (Sechium edulis) for the first time in New South Wales, in the Sydney Metropolitan Area. Mosaic was observed to be fairly general on cucumber crops in the Gosford district during the spring of 1940.

POWDERY MILDEW (Erysiphe cichoracearum) was very widespread and responsible for serious premature defoliation and death of pumpkin, marrow, squash, cucumber and rockmelon plants. Reports from the Windsor district indicated that the season was one of the worst on record for this disease.

SEPTORIA LEAF SPOT (Septoria cucurbitacearum) was recorded on pumpkin, marrow, hubbard squash and rockmelon in the Metropolitan Area.

SUNSCALD of pumpkin fruits was recorded in several instances following defoliation after an attack of powdery mildew.

EGG-PLANT.

A greening (virus) condition was recorded from Griffith.

LETTUCE.

DOWNY MILDEW (Bremia lactucae) was present in most crops throughout the year and was particularly severe, causing much leaf damage, for a short period in the autumn (1941). All commercial varieties grown appear to be susceptible to this disease, including those Imperial types which were resistant to all strains of

the fungus/

the fungus known to exist in the United States at the time of release of the varieties.

SCLEROTINIA ROT (Sclerotinia sclerotiorum) was recorded from the Metropolitan Area during the autumn and early winter of 1941, being apparently somewhat more severe than in the previous year but not as serious as two years previously. Fortunately this disease is not yet distributed in all lettuce growing sections. The disease caused by Sclerotinia minor with symptoms similar to that caused by S. sclerotiorum, except for the size of the sclerotia, was recorded for the first time in New South Wales from Gunnedah.

SPOTTED WILT (virus) was the most important disease during the past year, being present in all crops throughout the whole season. Losses of up to 50% were recorded for this disease in the late winter, spring and early summer of 1940. It was observed that infection was distinctly higher where flowers and ornamentals were grown on the same property as lettuce.

Serious losses from TIP-BURN (physiological) were recorded at Matraville in the Metropolitan Area in January 1941, 50% of the plants being affected. Growers stated that most of the affected heads were unmarketable. The condition was associated with a spell of cool wet weather followed by hot weather for a day or two.

MUSHROOMS.

BROWN SPOT (Verticillium sp.) was recorded from St. Ives (Metropolitan Area). Several cases of ROSE COMB (probably kerosene or oil injury) were reported. Weed fungi recorded included BROWN PLASTER MOULD (Papulaspora byssina), INK CAPS (Coprinus spp.) and a species of Peziza (at Rouse Hill).

ONION.

MILDEW (Peronospora destructor) was present in practically all plantings of onions in coastal areas in the spring but no severe losses were recorded.

PARSNIP.

PHYLLACHORA LEAF SPOT (Phyllachora pastinacae) was recorded, for the first time in New South Wales, from three localities in the Sydney Metropolitan Area. The only other disease recorded was ROOT KNOT (Heterodera marioni).

PEA.

CLADOSPORIUM SPOT (Cladosporium pisicolum) was recorded from Wyong.

FUSARIUM WILTS AND ROOT ROTS (Fusarium spp.) Several records but no details of any serious losses.

MOSAIC (virus) was recorded from the Sydney Metropolitan Area.

POD and LEAF SPOT DISEASES. BLIGHT (Mycosphaerella pinodes) and LEAF SPOT (Ascochyta pisi) were widespread but, as in previous years, only became serious in crops towards the end of the picking season.

POWDERY MILDEW (Erysiphe polygoni) was general. There were no reports of serious reductions of yield, however.

ROOT KNOT (Heterodera marioni) was reported from Wyong.

Sclerotinia Rot/

SCLEROTINIA ROT (Sclerotinia sclerotiorum) was observed at Prospect but infection was not severe and observations have shown that peas are fairly resistant to this disease in comparison with crops such as lettuce and beans.

STREAK (virus). Plants with symptoms suggestive of streak were observed in the Sydney Metropolitan Area.

POTATO.

BROWN ROT (Bacterium solanacearum) was recorded from several localities on the coast. Three acres at Repton were reported to be a total loss because of this disease.

EARLY BLIGHT (Alternaria solani). As usual, this disease was widespread in all Tableland crops and was responsible for considerable leaf spotting and probably for reductions in yield.

EELWORM (Heterodera marioni). Several records, the amount of disease being much the same as usual.

FUSARIUM WILTS AND TUBER ROTS (Fusarium spp.) as usual were present in almost all crops, the incidence of disease being about the same as in the preceding year.

LATE BLIGHT (Phytophthora infestans) did not occur in the spring but was present in most coastal crops grown in the autumn, many crops being completely destroyed. For the first time for several years the disease also occurred in the main potato growing areas on the Tablelands.

RHIZOCTONIA (Corticium vagum). According to Mr. A.C. Orman of the Division of Plant Industry, this disease was more prevalent than usual, being very severe on the Tablelands.

SCAB (Actinomyces scabies) was slightly less prevalent than usual.

VIRUS DISEASES: LEAF ROLL, MOSAICS, SPINDLE TUBER and WITCHES BROOM were present in the usual amounts, leaf roll as usual being the most important. SPOTTED WILT was present in coastal crops to a greater extent than usual, especially in the spring. In main crop areas on the Southern and Central Tablelands spotted wilt was also reported as being more prevalent than usual.

RHUBARB.

DOWNY MILDEW (Peronospora jaapiana) and LEAF SPOT (Phyllosticta straminella) were recorded from the Metropolitan Area.

SILVER BEET.

CERCOSPORA LEAF SPOT (Cercospora beticola) was again widespread and responsible for considerable losses.

DOWNY MILDEW (Peronospora schachtii) was recorded from the Sydney Metropolitan Area.

SNAKE BEAN.

RUST (Uromyces sp.) was recorded, for the first time in New South Wales, on this host at Bellata.

TOMATO.

BACTERIAL CANKER (Aplanobacter michiganense). Reports from officers of the Division of Plant Industry indicated that this disease was again of importance. It ranks second to spotted wilt in importance.

BACTERIAL SPOT (Bacterium vesicatorium). Several records but no serious damage reported.

BACTERIAL WILT (Bacterium solanacearum) was again recorded for several localities on the Coast.

EARLY BLIGHT (Alternaria solani), as usual, was present in most crops. In many autumn crops losses from fruit infection were severe. During spraying experiments carried out by the Entomological Branch principally for insect pest control, it was demonstrated that weekly applications of Bordeaux mixture at strengths of 1-1-10, 1-1-20 and 1-1-40 controlled, partially but not completely, the leaf spot stage of the disease. Copper oxychloride was not as effective as any of the three Bordeaux mixture sprays used. Basic copper arsenate gave encouraging results.

FUSARIUM WILT (Fusarium bulbigenum var. lycopersici) was again present in most crops and, even where some of the most resistant varieties were grown (e.g. Pritchard), losses were as high as 30% of the plants. In a few glasshouse crops where soil sterilisation was not practised over 50% infection was recorded.

LATE BLIGHT (Phytophthora infestans) was not recorded in any spring crops but was present to a slight extent in late autumn crops.

LEAF MOULD (Cladosporium fulvum) was again present in all glasshouse crops. Regular applications of Shirlan A.G. again gave good commercial control of the disease. With much wet weather in late autumn several cases of severe infection on outdoor tomatoes were recorded in the Metropolitan Area.

SEPTORIA SPOT (Septoria lycopersici) was not of very great importance. One case of light infection on 30% of the plants was observed in the Windsor district.

VIRUS DISEASES: BIG BUD was widely distributed but was not of great importance, less than one per cent of the plants being affected in most crops. The highest infections were recorded in sauce crops in the Bathurst district with up to 10% of the plants showing symptoms of big bud. SPOTTED WILT was by far the most serious disease of outdoor tomatoes. In spring crops in the Metropolitan Area losses from 50% to 100% of the plants were not uncommon. Elsewhere on the Coast in spring crops infection was not quite so high. A report on the situation in the Griffith district, where approximately 400 acres were planted with tomatoes for sauce or canning, stated that, in crops planted in late winter and early spring, infection averaged 30% to 40% whilst in crops planted in early summer 5% to 10% of the plants developed spotted wilt symptoms. Coastal crops grown during the late summer and autumn showed relatively light infection - usually less than 10%. STREAK was recorded from a number of glasshouses.

FRUIT CROPS.

CITRUS.

BLACK SPOT (Phoma citricarpa). In Coastal districts there has been less Black Spot than usual during the past year. In the Gosford area, where intensive observations have been made, early indications were that the disease would be rather severe, since from the middle to the end of October it progressed fairly rapidly on the mature unsprayed fruit. The rate of development declined very considerably during early November, and for the most part no

further/

further development took place after that period. This is quite abnormal as Black Spot usually continues to increase in severity during the early summer. It is considered that the low temperatures and abnormally high rainfall experienced in the Gosford area between November and January were responsible for this failure of the disease to develop to any serious extent.

Because of the small amount of Black Spot developing, very little spraying has been carried out in the past season, and should conditions during the coming spring be favourable for the development of the disease, losses may be expected to be considerable.

In some Gosford orchards - more frequently on the lowlands around Gosford - an unusual development of Black Spot occurred in June on the main crop and Intermediate Valencias; also on Navels and sweet-rind lemons. About 30-40 per cent of the orchards were affected, but the incidence was only about 2-3 per cent on the trees affected. The type of damage was that usually experienced in November-December, and appears to be the first case of "winter" Black Spot recorded. Very low temperatures, copious rains and good growing conditions obtained about this period and there were no high temperatures - even for one day - and no factors associated with fruit rind injury. No explanation can be offered for this unusual occurrence.

SPECKLED BLOTCH (cause undetermined). This disease has shown up very considerably during the past autumn on Navel and Valencia oranges in the Gosford district. It is possible that it may be an early phase of the Black Spot disease. This opinion is supported by the following facts:

1. Speckled blotch is more severe on the north-west side of the tree (Cf. Black Spot).

2. Spray applications reduce its incidence.

3. Speckled blotch lesions have repeatedly yielded pure cultures of Phoma citricarpa.

4. Black Spot lesions have occasionally been observed associated with Speckled Blotch blemishes.

5. When Speckled Blotch is severe in the autumn subsequent Black Spot development is usually bad.

Proof of the relationship must await the production of the disease experimentally.

SCAB (Sphaceloma fawcettii scabiosa). The cool, wet conditions of spring and early summer throughout the Coastal districts favoured the development of scab. Unsprayed lemon trees showed a very high percentage of badly scabbed fruit and shoots. In the Gosford district intermediate settings of fruit throughout the summer were also attacked. A moderate amount was present on rough lemon stocks in some metropolitan nurseries. There was a bad occurrence of scab on Wheeny grapefruit at Terrigal.

MELANOSE AND STEM-END ROT (Diaporthe citri). Weather conditions during spring and early summer in Coastal districts favoured the development of Melanose and new growth, especially on pruned trees, was severely attacked. In the Gosford district observations have shown that it is unlikely the very severe infection occasionally noted on cut-back trees can be due to inoculum from the Phomopsis stage alone.

The Diaporthe stage has been found fairly frequently in the older orchards and it is possible that this can act as an important source of inoculum.

In the Gosford area Melanose appears to be a less important cause of fruit blemish than formerly. In the case of late Valencias this is probably because of the widespread use of Bordeaux mixture spray, and in the case of Navels to the "skeletonised" pruning of trees, which has resulted in a marked reduction in the amount of dead wood, and therefore of inoculum.

Stem-end rot of Valencias and Navels continues to cause considerable loss, especially in the late Valencia crops. The disease does not appear to be enhanced by lack of tree vigour, nor is it controlled by spray applications either at blossom fall, as have been found effective in America, or at maturity.

MANDARIN BROWN SPOT (Cause unknown). This disease was severe on young growth and on the fruit in the Hills district. In the Hawkesbury River district, where fruit is generally free of the trouble, some losses were also experienced.

TWIG BLIGHT (Sclerotinia sclerotiorum). Twig blight was more serious than usual, especially in the Gosford district, in the cooler months of 1940. Apothecia were observed at Narara early in August and identified by cultural tests. Twig and leaf blighting was observed several weeks later. Citron trees proved most susceptible, large limbs being girdled and killed by the fungus. This occurred during a period of unusual dryness, but dews were heavy. The warm weather during late autumn of 1940, and the dry conditions, had induced a considerable "false bloom," and almost every manifestation of the disease had started from the decayed petals. This winter the first apothecia were found at Narara towards the end of May, 1941, but no twig blight has occurred though rainfall has been abundant. It is noteworthy that no late blossoming took place and no decaying petals were present to act as a possible infection path for the fungus.

Some twig blight occurred in Metropolitan nurseries during 1940, both on yearling rough lemon stock and on budded stock.

SEPTORIA SPOT (Septoria citricola). Conditions on the Murrumbidgee Irrigation Area and Murray River were not favourable to the development of Septoria and comparatively slight damage was caused. Experimental spray plots at Barooga (Murray River) and Griffith yielded no results as the controls and treated plots were equally free of the disease. At Leeton Bordeaux and Zinc-Bordeaux sprays applied in February gave very good control.

As previously noted, Septoria fruit spot is confined to the fruit on the southern side of the tree and appears to be associated with frost injury. A type of leaf spot found on all parts of the tree yielded Septoria on plating, but to date these leaf lesions have not been observed to produce spores and the source of inoculum for the infection of the fruit is as yet not known.

DRY STEM (non-parasitic). The Valencia crops in the Barham district showed the occasional development of this trouble, only the fruit on trees growing on the sandy ridges being affected. The reduction of the crop amounted to about 5% in some cases. Similar reports were received from Curlwaa.

GREEN MOULD (Penicillium digitatum). Fruit fly development in Valencia oranges was fairly widespread in Coastal districts in January and February of this year and resulted in heavy losses. However, in the Gosford area, green mould development following fly injury was even more serious. Large losses were experienced in the orchards, packing houses and at the markets. Intermediate crop grapefruit and Navel oranges, and to a less extent, lemons, were also affected. It is unlikely that, had borax dips been used

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in the packing houses, subsequent mould development would have been checked as infection had already occurred.

FRUIT SPOT (? bacterial). The fruit spot of Navel and Valencia oranges reported last year from the Wyong district has not reappeared so far.

SOOTY BLOTCH (Gloeodes pomigera). This was more in evidence than usual in Coastal orchards, on oranges and grapefruit.

COLLAR ROT (Phytophthora sp.). Collar rots have been prevalent especially during the spring months. Young plantings of lemons in the Hills district and at Moorlands and mature Navels in the Dooralong Valley have been affected. The position appears to be sufficiently serious to warrant a trial of high-budded resistant stocks.

ROOT ROTS: (1) ARMILLARIA ROOT ROT (Armillaria mellea) Armillaria root rot continues to cause serious loss, chiefly in the Mangrove Mountain, Maroota and Hawkesbury River districts. Probably the worst case at Mangrove Mountain was in an area of 340 seven-year old Navels where 170 trees were badly affected - many being dead. The disease had appeared two years after planting. On the same property four acres of Valencias were also destroyed by this disease.

(2)"GANODERMA"ROOT ROT (cause unknown). The roots of unthrifty citrus trees, especially in the Hills district and at Castlereagh showed a very severe development of typical "Ganoderma" lesions. Similar lesions have also been noted on the roots of unthrifty trees at Gosford, Griffith and in heavy river soil at Barham (Murray River). The rotting of root fibre of nursery trees noted in last year's survey and suggested as being possibly due to this disease was not present to any great extent this year.

VIRUS DISEASES. (1) LEPROSIS. A single case of what is apparently this disease occurred on yearling budded trees of a "Poor Man Thompson" cross at Grafton.

(2) PSOROSIS. No new occurrences of psorosis have been observed this year.

DIE-BACK OF WHEENY GRAPEFRUIT (cause unknown). All Coastal plantings of Wheeny grapefruit so far observed have shown a very serious limb die-back, which appears to be associated with heavy cropping. The worst manifestation occurred on trees carrying both main and intermediate crops, and the disease could not be correlated with lack of soil moisture. It commenced in the late spring and continued well into autumn. Trimming away affected limbs and application of Bordeaux sprays had no effect on the progress of the disease.

COASTAL DECLINE (cause unknown). The dying back of young growth of Navel oranges noted last year was again most serious, both in the Gosford-Wyong district and at Moorland. It occurred this season in the autumn as well as the spring and both young and old trees were affected. No crop at all or very poor crops were carried by badly affected trees. The die-back is not invariably associated with leaf mottling. As yet no results have been obtained from spray applications of minor elements, or injection experiments.

ROOT NEMATODE (Tylenchulus semipenetrans). Nematode infestation was very general and in a few cases on very poor sandy soil lacking in humus, appears to have a detrimental effect on the health of the tree. Surveys of the citrus nurseries in the Metropolitan Area show that it is present on the roots of most of them.

NON-PARASITIC DISEASES: (1) EXANTHEMA. Several serious cases of Exanthema occurred in the Gosford-Wyong district in unsprayed citrus groves. Washington Navels on sandy soil at Moorland also showed severe Exanthema.

Symptoms have also been recorded in orchards, especially of Navel oranges, in spite of the fact that growers periodically spray with Bordeaux mixture for Melanose. It will be interesting to observe whether the disease continues to increase in these orchards next season.

(2) MANGANESE DEFICIENCY. Trees in the Mangrove Mountain district showing leaf mottling have shown good response to combined manganese and zinc sprays.

(3) ZINC DEFICIENCY. Symptoms of zinc deficiency were observed occasionally in the Murrumbidgee Irrigation Area and Murray River districts and were reported from Menindie and Gilgandra.

(?) MANGANESE EXCESS. Severe losses of young trees were experienced by some citrus growers in the Dooralong Valley, trees on rough lemon and trifoliate stock being equally affected. The symptoms were first evident in the spring on trees just entering their second year. Young leaves and twigs developed a scorched appearance and died, and the older leaves showed a tendency to drop. On analysis the foliage gave a most abnormally high value for manganese. Older trees in similar soil were unaffected.

POME FRUITS.

BLACK SPOT (Venturia inaequalis). The disease was not favoured by spring weather except at Batlow. Light rain was frequently experienced there during the spring but all growers had sprayed their trees effectively and the fungus was unable to make headway. During summer and early autumn late spot appeared in check trees (unsprayed) in experimental plots in the Batlow district. Some 50-70% of this fruit was severely spotted. All other districts remained free from the disease. A feature of the season's experimental spraying was that copper oxychloride cover sprays at strengths as low as 3 ozs. - 100 gallons were included in programmes that completely controlled late spot at Batlow.

POWDERY MILDEW (Podosphaera leucotricha) was serious in certain orchards in the Kentucky (New England) district. Growers concerned reported that they had been unable to apply suitable lime sulphur sprays in the early spring "because of insufficient finance." There was evidence of neglect in the pruning operations.

BITTER or RIPE ROT (Glomerella cingulata) occurred in many districts during summer and early autumn, apparently as an outcome of showers and mild temperatures. The disease was particularly widespread in late maturing apples on Coastal orchards.

TRUNK CANKER (? Dothiorella sp.) continued to take toll of McIntosh Red trees in the Oakdale-Orangeville-Camden area. New infections were not numerous but in many trees there occurred collapse of limbs to which the fungus had progressed from trunks infected and neglected in previous seasons. In the Survey for the 12 months ending June 1939 reference was made to a block at Orangeville showing 100% infection of the McIntosh Red variety. These are now reported to have been removed in entirety during the 1940-41 season because of the progress of the fungus.

ARMILLARIA ROOT ROT (Armillaria mellea) was under notice only in the Kentucky district. It is reported that only one orchard there is affected but in that orchard at least 50% of the trees,

involving the varieties Jonathan, Democrat, Granny Smith and Five Crown, are incurably affected. The disease has been evident there for more than 10 years but recent drought years have emphasised its effects since the only sound roots are those in surface soil which has been very deficient in moisture.

BARK DISEASE and DIE BACK (Cytospora sp.) was evident in most districts where the trees are in weakened state either as a result of neglect, or exposure to sunscald through factors outside growers' control, e.g. premature defoliation through recent drought years. Particular note of the disease was made in certain Kentucky orchards.

LEAF SPOT (cause unknown) was prevalent in Jonathan trees in several districts. It was under observation in particular at Oakdale (Coastal), Albury (Inland) and Kentucky (Northern Tablelands). Certain fungi have been isolated with a view to determining pathogenicity. Magnesium deficiency is also under investigation as the possible cause.

INTERNAL and BLOTCHY CORK (Boron deficiency) is under control in most orchards as the result of boron treatment. Affected specimens were received, however, from an orchard (untreated) in the Moss Vale district and a few specimens were examined at Batlow, where there is reason to expect that deficiency diseases will soon be of considerable importance as a result of leaching on the steep slopes.

WATERCORE and BREAKDOWN (non-par.) has not been of any consequence this season, providing a contrast with the immediately preceding 2 or 3 seasons. Summer temperatures were lower, and far less conducive to the trouble this season.

BLEMISHES (non-par.) were not of consequence this season except where fruit, after picking, was left stacked in dump cases in the orchards pending cool-store space becoming available. In such cases lenticel scald was fairly common. The situation was more or less unavoidable because of the congestion caused by cessation of the export trade in apples.

PEARS.

BLACK SPOT (Venturia pyrina). Seasonal conditions did not favour the disease. At Camden there was not a trace of the disease whereas in the previous season - despite similarly droughty conditions - 90 to 100% of the Williams variety was severely affected. At Batlow this season spot occurred only on unsprayed trees of the Packham variety. It was of late-season development but, even so, affected more than 90% of the fruit on the trees concerned. At Orange about 20% of the fruit on unsprayed Packham trees developed late spot in February, and in the same district unsprayed Winter Nelis trees showed 100% late spot by March. A feature of the season was that all spray programmes, sulphur or copper, completely controlled the disease, despite dilution of the cover-spray strengths to lime sulphur 1-160, Colloidal sulphur 1-100, or Copper oxychloride 3 ozs. - 100 gallons.

BLOSSOM and SPUR BUD BLIGHT (cause unknown), suspected of being associated with Boron deficiency, was not brought under notice in any district. General unthriftiness and decline of pear trees, an associated condition, was still noticeable in various districts, however, particularly on inferior greyish coloured soils. At Orange sunflower plots were sown on this type of soil with a view to obtaining indications of Boron deficiency. The only outcome, however, was a poor development of the sunflowers, attributed to the combination of abnormally low rainfall and general impoverishment of the soil.

INTERNAL CORK and SURFACE CRACKING (Boron deficiency) was of interest this season in that at Kentucky symptoms began to re-appear in pear blocks which had not received soil applications of borax for 3-4 years.

BLACK-END (non-par.) was noted in several districts. Whilst the Japanese stock Pyrus serotina is in some cases apparently associated, this would appear to be only one of many causes. The primarily important cause, on observational evidence, appears to be unsatisfactory moisture relationships. Drought conditions have therefore been important in the occurrence of the condition in this and the recent seasons.

LENTICEL SCALD (non-par.). A condition apparently identical with the lenticel scald of apples was evident in pears received on the Sydney Market from Batlow. Growers have in several instances been obliged to leave the harvested fruit in the orchard in "dump" cases pending cool store space becoming available, and this would account for the scald. It is a corollary of the acute congestion created by the lack of export of pome fruits as a result of the war.

QUINCE.

FLECK (Entomosporium maculatum) was the only disease of note in quince trees. Severe leaf spot was noted in Coastal trees.

STONE FRUITS.

BROWN ROT (Sclerotinia fructicola) was of no consequence except in mid- and late-season peach, nectarine and plum varieties in County Cumberland. During the period mid-January to mid-February peach varieties such as Blackburn Elberta, Elberta, Rowe's Champion and Shanghai Cling were intermittently affected at a time when mild temperatures and high relative humidities prevailed. A severe epidemic of fruit-fly aided the fungus. Apricots in the East Kurrajong Area were harvested quite free from the disease in November and December. Plum and cherry crops on the Tablelands were also free from the disease. They ripened during drought conditions.

FRECKLE (Cladosporium carpophilum) was confined to Coastal orchards and there it was only of light incidence. Some 5-10% of the fruit in unsprayed Shanghai trees was rendered unsaleable but wherever the trees have been under recommended treatment in recent seasons the trouble was scarcely in evidence.

RUST (Puccinia pruni-spinosae) was checked by the dry spring in all districts. On the Murrumbidgee Irrigation Area the disease was not in evidence, even in the autumn. On the Coast the early maturing peach varieties were prematurely defoliated by summer development of the disease following intermittent rainy periods. Prune trees at Young were reported to have been severely affected early in autumn as a result of late development of the disease. Most of the defoliation in that district, however, was hastened not by Rust but by Red Spider. On the Northern-Tablelands the disease was only of late summer and early autumn occurrence. At that stage it was widespread in apricot as well as peach and plum foliage.

SHOT-HOLE SCAB (Clasterosporium carpophilum) was of importance in apricot trees on a few Coastal blocks where spraying is not practised. It made no appearance in apricot trees on the Murrumbidgee Irrigation Area, despite absence of spray applications. Almond trees, however, in all districts where they are grown, showed normally severe incidence of the fruit "gum-spotting." This is the usual occurrence in almonds since they are rarely pruned or sprayed in this State. Frequently they are present only as wind-

breaks.

LEAF-CURL (Taphrina deformans) was scarcely encountered. Most peach and nectarine growers now apply a "delayed dormant" fungicide, but in any case, the early spring weather was quite unfavourable to this fungus.

BARK DISEASE and DIE-BACK (Cytospora sp.) was again in evidence in all districts, but particularly in cherry and prune orchards. Unfavourable environment is undeniably responsible for the widespread activities of the fungus. At Yenda, on the Murrumbidgee Irrigation Area, soil moisture shortage resulting from unsatisfactory irrigation practice was concluded this season to be the major factor concerned.

CROWN GALL (Bacterium tumefaciens) has been of extremely rare occurrence in Nursery rows lifted in 1941. At one County of Cumberland Nursery, where 33% of the trees dug in the previous year were affected, the incidence this year was as low as one galled tree in several thousand. To some extent this was attributable to the use of ground not planted to fruit trees for the previous 30 years. Environmental factors of unknown character have apparently played some part, however, since the incidence was also much lower - less than 5%-in trees on soil known to be seriously infected.

BACTERIOSIS (Pseudomonas mors-prunorum). No new records of this disease were made this season, nor was it possible to obtain fresh isolates of the organism from cherry trees known to have shown the disease in fruit and/or limbs in previous seasons. Prune trees at Yenda, on the Murrumbidgee Irrigation Area, showed symptoms suggesting that the organism may be active but the bacterium was not isolated. A difficulty in isolation of this organism is that it is as a rule dead by the time macroscopic symptoms appear in woody parts of the trees.

ROOT KNOT (Heterodera marioni) was again active in lighter soils along the Georges and Hawkesbury Rivers. Particular note was taken of peach trees at Glenfield under irrigated conditions. The Rowe's Champion trees concerned, some 10-12 trees, previously growing satisfactorily, were on sandy soil about two feet deep overlying clay. Water-logging in the clay had weakened the lower roots and during the season the trees, dependent on shallower roots, collapsed because of the heavy nematode infestation of roots in the two feet of sand.

ROSETTE or MOTTLE LEAF (Zinc deficiency) was under control in peach trees previously affected at Leeton and Wedderburn.

CHLOROSIS (Manganese deficiency) of peach trees was under control in test plots at Wedderburn.

INTERNAL BROWNING (non-par.) of Pullar Cling peaches on the Murrumbidgee Irrigation Area did not occur this season. Temperatures during the final days of ripening were consistently mild, mostly 70° - 90°F. Tests with artificially induced high temperatures, by means of a radiator, only succeeded in demonstrating that 83°F., the highest temperature recorded, was not high enough to induce the Browning.

SUNSCALD of stone fruit trees, evidenced by the strip of killed bark and cambium on northern surfaces of limbs, is still widespread and serious. This is perhaps the major trouble of stone fruits in the State. Sustained drought effects on foliage shading, and premature defoliation through functional and pathogenic disorders contributed to the exposure of the wood. Pending investigation it is not clear to what extent the injury occurs during winter months whilst foliage is naturally absent.

BANANAS.

BUNCHY TOP (virus). The incidence of bunchy top for the six months to December 1940, calculated on the monthly findings of diseased plants, was 0.17 plants per acre for all infected districts, compared with 0.16 for 1939 and 0.23 for the same period in 1938. The Tweed district, where 17,051 acres were inspected and 3,479 plants treated during the half year, had the highest incidence, with 0.21. This, however, represents a substantial reduction compared with the same half year in 1939, when the figure was 0.38. The 1940 figures for the Brunswick were 0.04 and the Richmond 0.07, while in the Yarrahappini district 2 infected plants only were found. Coffs Harbour - Woolgoolga district is still Bunchy-top free. Eradication figures for Yarrahappini are as follow: 1937, 90 Bunchy-top plants found; 1938, 64 plants found; 1939, 8; 1940, 2; 1941, 2.

The control campaign is working harmoniously but no progress has been made with the proposal of the Banana Growers Federation to institute digging out of plants in addition to spraying with power kerosene, as at present practised.

LEAF SPOT (Cercospora musae). Losses from leafspot during 1940 were not as great as in the previous year, although they were substantial and much thin fruit was sent to market. In many plantations the heavy defoliation which occurred in August was the direct result of chilling following frequent heavy frosts on the lowlands. Many growers attributed this loss of foliage to leaf-spot.

Already, severe defoliation has occurred in the Tweed, Brunswick and Richmond districts as a result of leafspot. This severe out-break is related to a very wet summer and it is forecast that loss of fruit will be heavy. Again, there has been almost a total absence of leaf spot in the Coffs-Woolgoolga area; which is attributed to the summer being cool, and the supplies of inoculum lighter (following the drought in the previous year).

A satisfactory control programme has been developed, and leading growers have adopted it with great success. One grower claims to have doubled his harvest already for 1940-41 production over his previous average. This figure, of course, would represent the resultant of 2 year's spraying operations and is thought to be weighted by an exceptionally good season.

YELLOW LEAF SPOT (Cordana musae). Again widespread in plantations in "cold" locations where it seems to follow in a secondary capacity to Cercospora leaf spot and Red spider injury. It is not decided yet whether the fungus is one of importance under conditions favourable for bananas.

INFECTIOUS CHLOROSIS (virus). This disease persists in the Richmond district, and during the year has increased in importance. Whereas, for the year ended 30/6/40, 1000 plants were destroyed by Banana Federation detector gangs, for the period 1/7/40 - 17/5/41 2600 plants were destroyed exclusive of those destroyed by growers. Many affected plants were also destroyed in the Tweed and Brunswick districts, being mainly residues of old primary infections.

LEAF-FALL (Physiol.). This disease was occasionally seen on old grassland areas, where fertilisers were not used.

PANAMA DISEASE (Fusarium oxysporum): 2 stools found infected at Broadwater.

RUBBERINESS (Physiol.). This defect has been prominent during the autumn and winter months in a number of consignments on the Sydney Markets.

SPECKLE (secondary to Red Spider and Mite Injury). Speckle was less destructive this season than for some years past. This is believed to be related to the summer being cool and wet, thus exercising control on the Acarids.

SQUIRTER (Nigrospora sphaerica). Considerable quantities of squirter fruit have appeared on the Sydney Market during the autumn and winter and reports from Southern markets indicate severe losses. The Banana Growers' Federation has given consideration to compulsory bulk treatment at railheads but have deferred action this year, hoping to encourage by various means the individual case-dipping of fruit.

BLACK-END, STEM-END ROT and RIPE ROT (Gloeosporium musarum et al). Of little importance during the summer owing to its mild nature.

CHILLING (non-par.). For many years, blackening or spotting of the skin of advanced bunches by cold winds has been recognised, but foliage injury has been overlooked. During July 1940, in the Tweed Valley, heavy frosts occurred on nine out of eleven consecutive nights on the lowlands. This was followed by the observation in the next week or two of a large increase in dead leaves in low-lying plantations. In bad cases, plants carrying half-filled advanced bunches were defoliated; and in some cases late development of leaf spot was considered by growers to be the cause. The association of Cercospora leaf spot lesions and later spore masses of Cordana musae was the reason for the confusion.

The leaf injury induced by chilling is of a characteristic type, showing as a rapid yellowing and browning of the margin; in some cases, the large dead areas extend into the mid-rib. This is the appearance in "entire" leaves, but in leaves ribboned by wind isolated rectangular brown areas defined by the tears are to be seen. The widespread nature of the chilling indicates just how near the margin of climate many of the New South Wales plantations are.

FIG.

"MOSAIC" (undet.). Doubt has been raised as to whether this mosaic disease is a genuine virus trouble. Presence of a mite or several species of mites in the buds has led to the "mite" hypothesis being advanced. This aspect is being examined before further virus studies are undertaken.

LEAF SPOT (Phyllosticta sp.) from Canley Vale.

GRAPE.

In the Metropolitan and surrounding districts the common diseases BLACK SPOT (Gloeosporium ampelophagum), DOWNY MILDEW (Plasmopara viticola) and POWDERY MILDEW (Uncinula necator) caused considerable defoliation on unsprayed vines.

MULBERRY.

LEAF SPOT (Cercospora moricola). Two diagnoses from Cowra and Coonabarabran were made during March.

PAPAW.

MOSAIC (virus). As observed in former years, this is a prominent feature of nearly all plants in the winter months.

PASSION FRUIT.

WOODINESS (virus) is still a limiting factor in production.

Surveys/

Surveys have not yet revealed a single healthy vine in New South Wales. Seed transmission of the virus is suspected and is being closely examined

BROWN SPOT (Alternaria passiflorae). Reports indicate that Brown Spot has been more destructive this season than for many years. Growers who have sprayed with Bordeaux mixture have obtained good control. A trial of copper oxychloride (1 lb. in 32 gallons) at Kulnura showed control equal to 3-3-40 Bordeaux mixture.

STEM ROT (Sclerotinia sclerotiorum) caused considerable loss of canes in several plantations.

SCAB (Cladosporium sp.). Fruit spots common in some plantations in Baulkham Hills district. Blighting of terminal shoots seen in one plantation at Kulnura.

PINEAPPLE.

No reports of disease.

STRAWBERRIES.

CRINKLE (virus). This virus is widespread in all commercial stocks. Progress has been made in the Departmental scheme for raising of crinkle-free runners from seedlings and already the crossbred - Richmond Red, is under commercial trials. It appears that existing named varieties will be replaced as seedlings of similar type become available.

LEAF BLIGHT (Dendrophoma obscurans) was recorded for the first time in this State, but its widespread distribution indicates that it has been here for some years. It is believed to be relatively important as a cause of defoliation and blighting of fruit trusses. From observations made this season it appears to be more important than Scorch in Coastal districts. It is even being considered as the chief cause of the so-called "wilt" disease.

LEAF SCORCH (Mollisia earliana).was present in most crops but was obscured by Leaf Blight.

LEAF SPOT (Mycosphaerella fragariae) was plentiful at Richmond but was relatively uninportant on other crops inspected.

WILT DISEASE or ROOT ROT (cause undet.) The return to a season of ample soil moisture provided an opportunity for inspection of this disease. From the darkened roots a species of Fusarium was constantly isolated and every plant showed the presence of Dendrophoma obscurans and Crinkle. Inoculation trials with the isolants are planned.

SULTANA.

BLACK SPOT (Gloeosporium ampelophagum). Report of New South Wales Dried Fruits Board for 1940 stated that production of sultanas in the Murrumbidgee Irrigation Area was well below average due to Black Spot which developed subsequent to rain during October and November 1939. Dry conditions later arrested the disease but a heavy drop of affected berries occurred, materially affecting the tonnage.

ORNAMENTALS.

In the following notes, the remarks deal firstly with Spotted Wilt and Crown Rot, as these are serious diseases which affect numerous ornamentals. Notes are then given of the occurrence of various diseases under a host arrangement.

SPOTTED WILT. This virus disease is undoubtedly the most important single disease affecting ornamentals in the Metropolitan Area. The list of its hosts includes many of the species commonly grown for cut flowers. The following are amongst the most important:

POPPIES showed 10-100% infection and no district appeared to be free of the disease. DAHLIAS appeared to be universally infected without showing any substantial loss in vigour. CHRYSANTHEMUMS showed a considerable percentage of infection in all areas. DELPHINIUMS were severely affected in the St. Ives and Smithfield districts. Heavy infection was noted in ASTERS in all flower-growing districts. It was noted that the white and light pink varieties were mostly killed outright, the deeper pinks less severely affected but flower production poor, while the deep purple varieties, though showing leaf symptoms, were able to flower fairly well. All plantings of ZINNIAS showed severe infection. The Blacktown and Prospect SWEET PEA plantings which two years ago showed severe "streak," probably due to Spotted Wilt, were this season completely free of the disease. One planting only, in the Liverpool district, showed 100% infection. HIPPEASTRUMS were severely affected in the early summer. LILIUM HENRYI and L. REGALE were most severely affected, young leaves and shoots being blighted and killed.

CROWN ROTS. Next in importance to Spotted Wilt was the group of Crown Rots, Root Rots and Wilts caused by Corticium rolfsii, Fusarium spp., Rhizoctonia sp., Phytophthora spp., Thielaviopsis basicola, Verticillium dahliae, &c.

CARNATIONS were most seriously affected, losses ranging from 5-75% and no plantings were entirely free of the trouble. Fusarium and Rhizoctonia appear to predominate in sandy soils and Corticium rolfsii and Fusarium in the heavier soils of the North Shore, Carlingford and Blacktown districts. Losses due to Fusarium wilt of ASTERS were nowhere serious. Corticium rolfsii caused considerable losses in some Carlingford plantings of ANTIRRHINUM and Fusarium was responsible for 5% loss in some Fairfield plantings. In one Smithfield nursery a loss of over 50% was due to Verticillium dahliae, which fungus was also found to be responsible for a devastating wilt of GERBERAS. Verticillium dahliae again occurred on CHRYSANTHEMUMS, two outbreaks being noted, one at Auburn where it was first recorded, and one at Carlingford. NEMESIAS, especially the variety Blue Gem, were seriously affected by a root rot caused by Thielaviopsis basicola. STATICE, ESCHOTZIA and CALLIOPSIS were affected by Phytophthora spp. Considerable losses of DELPHINIUMS due to Crown Rot caused by an unidentified fungus were recorded in all Delphinium plantings. Some commercial plantings of ZINNIA were severely affected by Crown Rot due to an unidentified fungus. SWEET PEAS in the Blacktown, Prospect and Seven Hills districts showed up to 60% damping-off, probably due to Phytophthora sp. Seedlings in new ground were said to be affected as severely as those growing in land which had previously borne sweet peas.

ANTIRRHINUMS.

BACTERIAL SPOT (Bacterium sp.). A bacterial leafspot was observed affecting 10% of seedling plants in seed trial grounds at Dundas, and also in the Wyong district. This is the first record of a bacterial leaf spot of antirrhinums in N.S.W.

ANTHRACNOSE (Colletotrichum antirrhini). This disease was not serious in any district during the past year, and does not appear to have caused losses.

ASTERS.

SPOTTED WILT: See above.

ROOT ROT: See above.

Azaleas/

AZALEAS.

LEAF CURL (Exobasidium vaccinii).

BEGONIA SEMPERFLORENS.

LEAF BLIGHT (Botrytis cinerea).

BELLIS PERENNIS.

RUST (Puccinia distincta).

CALENDULA.

RUST (Puccinia distincta).

CANDYTUFTS.

CLUB ROOT (Plasmodiophora brassicae). No obvious signs of wilting or stunting were observed.

CARNATIONS.

CROWN ROT. See above.

RUST and SEPTORIA SPOT (Uromyces caryophyllinus and Septoria dianthi). Both these diseases were prevalent during the summer and increased in amount during the autumn, causing loss of foliage and reduced vigour. This was especially so in the moister lowlying parts of Carlingford and on the North Shore, and to a less extent, in the Narrabeen-Warriewood district, but in the higher, less damp parts of Carlingford and in the Blacktown and Smithfield districts, rust and leaf spot were of very minor importance.

MOSAIC (virus). Some nurseries showed a high proportion of mosaic-infected plants, but on the whole this disease did not become important during the past season.

LEAF CURL (cause unknown). A disorder which occurred throughout all carnation growing districts involved the twisting and malformation of foliage and the distortion of flower buds so that the flowers did not open, or if they did were unsaleable. It appears so far to be restricted to the variety Salamander and involved 5-100% of the plants.

No cases of Sporotrichum poae were noted during the past season, but a number of cases of spotting and moulding of the petals, due to an unidentified fungus, occurred during the damp weather of early summer. In some cases this was associated with injury due to thrips.

CHRYSANTHEMUMS.

SPOTTED WILT: See above.

LEAF SPOT (Cylindrosporium chrysanthemi). Good growing conditions in the spring and early summer resulted in very luxuriant vegetative growth. This apparently favoured the development of Cylindrosporium, as it appeared in epidemic form in the summer and autumn and completely spoiled the harvest of some varieties. Crops cut back in the summer for late flowering were not affected at all severely until very late autumn. A good deal of difference in varietal susceptibility was observed, some varieties being nearly immune whilst in others all the leaves were killed.

RUST (Puccinia chrysanthemi). Conditions favouring Cylindrosporium also favoured the development of rust, and it appeared in considerable quantity, but in most cases too late to do much damage.

POWDERY MILDEW (Oidium sp.). This was recorded for the first time in the late autumn.

CINERARIA.

RUST (Puccinia distincta).

DAHLIAS.

POWDERY MILDEW (Oidium sp.). This was very general in almost all dahlia plantings, but as it did not appear until late autumn after most of the flowers were over, little damage was caused. It has not been recorded in N.S.W. previously, but in view of its very widespread occurrence this season and its almost simultaneous appearance in widely separated districts it is likely that it has been here for some time.

LEAF SPOT (Entyloma dahliae). This was very general in North Shore Nurseries in the late autumn and was also reported from Glen Innes.

BLIGHT (Sclerotinia sclerotiorum). This fungus was found causing considerable damage to old plants in the St. Ives district during the moist weather of late autumn. Entry appeared mostly to have been through dying petals, but cases of direct infection of undamaged leaves were noted. The fungus invaded the stem, forming sclerotia in the central empty core, and is capable of causing a tuber rot if its progress is not stopped.

DAPHNE.

CROWN ROT (Corticium rolfsii).

DIE-BACK (Sclerotinia sclerotiorum).

DELPHINIUMS.

POWDERY MILDEW (Erysiphe polygoni). This disease was fairly general but was readily held in check by sulphur dusts or lime sulphur sprays.

LEAF SPOT (? Ascochyta sp.). This was observed in two widely separated districts in the early autumn causing spotting and early death of leaves. Subsequently stems were attacked and rotted.

GEUM. (Mrs. Bradshaw).

DOWNY MILDEW (Peronospora potentillae).

GLADIOLUS.

SCAB (Bacterium marginatum). Neck rot due to scab was quite common during the early spring, and, in association with very severe attacks of Thrips, caused losses in the Carlingford-Pennant Hills areas. Slight to severe scab was observed on the stock of many commercial growers after lifting, but in most cases this could be traced to failure to dip, or lack of care in dipping.

HARD ROT (Septoria gladioli). This disease was found to be fairly prevalent throughout the stock of several metropolitan and Gosford growers. It is possible that it has been mistaken by growers for scab and treated as such in the past. Leaf lesions were quite common on old plants at Gosford. No differences in varietal susceptibility were noted.

FUSARIUM ROT (Fusarium sp.). A corm rot due to Fusarium sp. was found to be very general throughout all gladiolus growing districts but nowhere assumed serious proportions.

Botrytis Blight/

BOTRYTIS BLIGHT (? Botrytis gladioli). Leaf blight due to Botrytis sp. was not uncommon throughout the latest plantings of gladiolus. Where this occurred after flowering it is possible that no great damage was done, the leaves being killed only shortly before digging time. Quite frequently, however, infection occurred before flowering and the flowers were either spoiled by spotting of the petals or were prevented from developing.

A case of severe corm rot due to Botrytis was recorded, the variety Betty Nuthall being more seriously affected than other varieties.

HOLLYHOCK and MALVA Sp.

RUST (Puccinia malvacearum).

ICELAND POPPY.

SPOTTED WILT. (See above).

DOWNY MILDEW (Peronospora arborescens). This was noted in almost all flower growing districts but not in a severe form.

LUPINS.

SORE-SHIN (virus).

MESEMBRYANTHEMUMS.

WHITE BLISTER RUST (Albugo candida).

MIGNONETTE.

LEAF SPOT (Cercospora resedae).

PHLOX DRUMMONDII.

LEAF and STEM SPOT (Septoria divaricata).

PHLOX PANICULATA.

BUD NEMATODE (Anguillulina dipsaci).

PYRACANTHA COCCINEA LALANDEI.

BLACK SPOT (Fusicladium pyrinum var. pyracanthae).

ROSES.

POWDERY MILDEW (Sphaerotheca pannosa) was rather prevalent during the late spring, but the damage done was not serious.

BLACK SPOT (Diplocarpon rosae). The moist conditions obtaining during the spring and early summer proved most favourable for the development of this disease, and complete or partial defoliation occurred in susceptible varieties and very few, even of those usually most resistant, escaped damage. Flower production in commercial plantings of such varieties as Talisman, Golden Ophelia and Hadley was greatly reduced. A survey of varieties in metropolitan nurseries and gardens showed that where the amount of inoculum was large and the weather conditions favourable, almost all of the commonly grown hybrid tea, multiflora and polyantha varieties could become severely infected. Pernettiana roses were as usual specially susceptible. The heavy spring infection resulted in the fungus being present on the foliage throughout the summer. In the autumn another, though less serious outbreak, occurred in the Carlingford district. Here, one large block of

Radiance/

Radiance roses, normally a rather resistant variety, was heavily attacked and flower production much reduced.

STATICE SINUATA.

LEAF SPOT (Cercospora sp.) Premature death of lower leaves was caused.

STOCKS.

BLACK ROT (Bacterium campestre var.). Several serious outbreaks of black rot occurred in the 1940 season, but in 1941 very few commercial plantings of stock escaped annihilation by this disease. Considerable spread was observed to take place in the seed beds.

MOSAIC (virus). A very few cases of mosaic were noticed.

ALTERNARIA LEAF SPOT (Alternaria sp.). A species of Alternaria was recorded, associated with a yellowing of old leaves, of mature plants in the Wyong district.

BLIGHT (Sclerotinia sclerotiorum). This fungus was recorded causing a rot of stocks in the Wyong district.

SWEET PEAS.

POWDERY MILDEW (Erysiphe polygoni). This disease started to show up in most sweet pea plantings during the autumn and winter, but sulphur dusts or lime sulphur sprays were very generally used and no serious development took place.

VERBENA.

POWDERY MILDEW (Oidium sp.)

VIOLETS.

SCAB (Sphaceloma violae). Wet and cool conditions in the spring favoured the development of scab, and violets in all flower growing districts were very seriously affected. The warmer and drier weather of the new year led to a substantial recovery, and losses do not appear to have been large.

MOSAIC (virus). Mosaic was rather prevalent in many violet plantings, but does not appear to reduce the flowering to any extent. A new variety Blue Danube put on the market this year is affected with Mosaic.

WALLFLOWER.

DOWNY MILDEW (Peronospora parasitica).

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MISCELLANEOUS PLANTS.

DOCK (Rumex sp.)

LEAF SPOT (Ovularia sp.) from Matcham, amongst weeds growing at edges of bean and pea crops).

"BINDY-EYE" (Calotis hispidula).

RUST (Puccinia calotidis). Accial stage of rust on leaves from Bourke.

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